

## **BARC VISIT**

The students of NMIMS – School of Science, Mumbai visited ‘BHABHA ATOMIC RESEARCH CENTRE’ (BARC), Trombayon 4<sup>th</sup> January, 2013, as a part of educational visit organized by Industrial Interface cell along with faculties Dr. Shilpee Sachar and Dr. Purvi Bhatt.

BARC is a premier multi-disciplinary Nuclear Research Centre of India having excellent infrastructure for advanced Research and Development with expertise covering the entire spectrum of Nuclear Science, Engineering and related areas.

During the industrial visit, a brief introduction and overview of BARC was given to the students highlighting the advantages of nuclear energy and its potential applications in biomedical research, food security, material sciences, nanotechnology, waste management, energy security, crime detection, use of radioisotopes, brachytherapy, teletherapy. The students were then taken for the facility tour during which the following departments were covered:

**SUPERCOMPUTING facility:** (BARC) here has developed a very high speed ANUPAM-XENON/128 supercomputer, achieving another significant milestone in the field of supercomputers. The computing speed of this 128 processor ANUPAM supercomputer is 202 Giga Floating Point Operations per Second (GFLOPS) on High Performance Linpack benchmark program and is about three times faster than the 64-node supercomputer developed in July 2002.

The BARC supercomputers are being used for solving very large computational problems in the fields of Condensed Matter Physics Simulations, Electronics Structures and Molecular Dynamics Simulations, Radiation Chemistry, Atmospheric Chemistry, Finite Element Analysis of non-linear problems, Computational Fluid Dynamics.

**NUCLEAR REACTOR Facility:** Dhruva reactor, India's largest nuclear research reactor. It is India's primary generator of weapons-grade plutonium-bearing spent fuel for its nuclear weapons program. Originally named the R-5. It is designed as a larger version of the CIRUS reactor, Dhruva was an indigenous project built to provide an independent source of weapons-grade plutonium free from safeguards. The Dhruva project cost 950 million rupees. The reactor uses heavy water (deuterium) as a moderator and coolant. Aluminum clad fuel rods containing natural uranium are used to obtain a maximum power output of 100MW. According to conservative estimates, the reactor produces an average of 16–26 kg of weapons-grade plutonium per year in its spent fuel.

**MOLECULAR BIOLOGY LAB:** The lab is equipped with modern scientific equipments like Microarray Instrument. A microarray is a multiplex lab-on-a-chip. It is a 2D array on a solid substrate (usually a glass slide or silicon thin-film cell) that assays large amounts of biological material using high-throughput screening methods. Also, the students got an opportunity to visit electron microscopy lab, where they learnt the functioning of Transmission Electron Microscope (TEM) which provides highly magnified view of micro- and nanostructures. The high resolution imaging mode of the instrument helps in predicting the atomic arrangements in a sample.

The overall visit was absolutely an incredible experience. The visit proved to be very informative and educative for the students.